Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63,2007, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ;) (600 kN-m/m ;).

.5 ASTM D1557-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ;) (2,700 kN-m/m ;).

.6 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.2 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; first class excavation and second class excavation.

.1 First class excavation : all rock cuttings requiring the use of an air hammer, blasting or other machinery other than a conventionnal shovel excavator to excavate.

.2 Second class excavation: excavation of materials of whatever nature, which are not included under definitions of first class excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.5 Backfill : crushed stone and sand as required by the specifications and meeting the criteria for each type of materials

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control:

.1 Submit to Departmental Representative written notice when bottom of excavation is reached.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, location plan of relocated and abandoned services, as required.

.4 Samples:

.1 Inform Departmental Representative at least 2 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.

1.4 QUALITY ASSURANCE

.1 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

1.5 WASTE MANAGEMENT AND ELIMINATION

.1 Separate waste materials for use / reuse and recycling.

1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.

.2 Check inverts of pipes and ensure that elevation match those shown on plan. In the event or the elevation do not match, notify the departmental representative.

.3 Take necessary arrangement to temporary relocate the power supply of the lighting system during work.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing. Costs for such Work to be paid by Departmental Representative.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

Granular foundation shall be conform to the following requirements:

.1 Crushed stone MG-20

.1 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes shall conform to CAN/CGSB-8.1.

.2 Granulometric requirements conform to the following:

Sieve Designation	% Passing
31.5 mm	100
20 mm	90 - 100
14 mm	68 – 93
5mm	35 - 60
1,25mm	19 - 38
315 um	9 - 17
80 um	2 – 7

.3 Liquid limit: not more than 25, in accordance with ASTM D 4318.

.4 Plasticity index: not more than 6, in accordance with ASTM D 4318.

.5 Los Angeles test: lost of maximum weight of 45 % in accordance with ASTM C 131.

.2 Crushed stone MG-56

.1 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. The grading curve plotted on a semi-logarithmic diagram must be continue and progressive.

Sieve Designation	% Passing
80 mm	100
56 mm	82 - 100
28 mm	50 – 80
5mm	25 - 50
1,25mm	11 - 30
315 um	9 - 18
80 um	2 – 7

.2 Liquid limit: not more than 25, in accordance with ASTM D 4318.

.3 Plasticity index: not more than 6, in accordance with ASTM D 4318.

.4 Los Angeles test: lost of maximum weight of 40 % in accordance with ASTM C 131.

.3 Sand CG-14

.1 Free of particules larger than 5 mm in diameter.

.2 Granulometric requirements conform to the following:

Sieve Designation	% Passing
5 mm	35 - 100
1,25mm	
315 um	
80 um	0 – 10

.4 Class B material :

.1 Backfill material free of organic matter, asphalt residues or others contaminants with a content of fine particule less than 10 % and which larger particule are less than 300 mm in diameter.

Part 3 Execution

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly with a saw along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 PREPARATION/PROTECTION

.1 Protect existing features.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed and protect buried services that are required to remain undisturbed.

3.3 EXCAVATION AND FILL FOR THE IMPLEMENTATION OF CONCRETE BASES FOR THE TRAFFIC LIGHTS

.1 The excavation must be made as shown on plan.

.2 The contractor is responsible for determining the slopes of excavation based on the type of soil, moisture, or other factors which may cause unstable soils.

.3 Seat of the concrete base is to be formed with a thickness of 150 mm of MG-20 to 98% compacted stone. In case of heavy water inflows, a layer of clean stone 20 mm coated with a geotextile be accepted.

.4 If the excavated material is considered suitable quality by the Departmental Representative, it may be reused as backfill. If not, a layer of class B equipment will be accepted up to 300 under the line of paving. The last 300 mm should be covered with the MG-20 to obtain a degree of compaction of 98%.

3.4 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

3.5 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated on plan.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.4 Restrict vehicle operations directly adjacent to open trenches.

.5 Dispose of surplus and unsuitable excavated material off site.

.6 Do not obstruct flow of surface drainage.

.7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.8 Notify Departmental Representative when bottom of excavation is reached.

.9 Obtain Departmental Representative approval of completed excavation.

3.6 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.

.1 Under the infrastructure line: backfilled by successive thickness of 300 mm class B backfill compacted to 95 %.

.2 Under the paving asphalt: provide 150 mm compacted thickness base course of MG-20. Compact base course to 98 %.

.3 Under each concrete base: provide 150 mm compacted thickness base course of sand CG-14. Compact base course to 98 %.

3.7 COMPACTION

.1 The compaction equipment should allow to obtain materials with the density required of the work.

.2 Compaction :

.1 MG20 : 98 % in accordance to ASTM D 698.

.2 Class B material : 95% in accordance to ASTM D 698.

.3 Profile and roll alternatively to obtain a uniform and equal layer well compacted.

.4 During compaction, add necessary water to obtain the density of the material required.

.5 In place, where it is impossible to use compaction equipment, compact the material until the required density with mechanical tampers approved by the departmental representative.

.6 Correct irregularities in the surface by loosening the soil and by adding or removing material, until the level of the surface conforms to the prescribed tolerances.

END OF SECTION